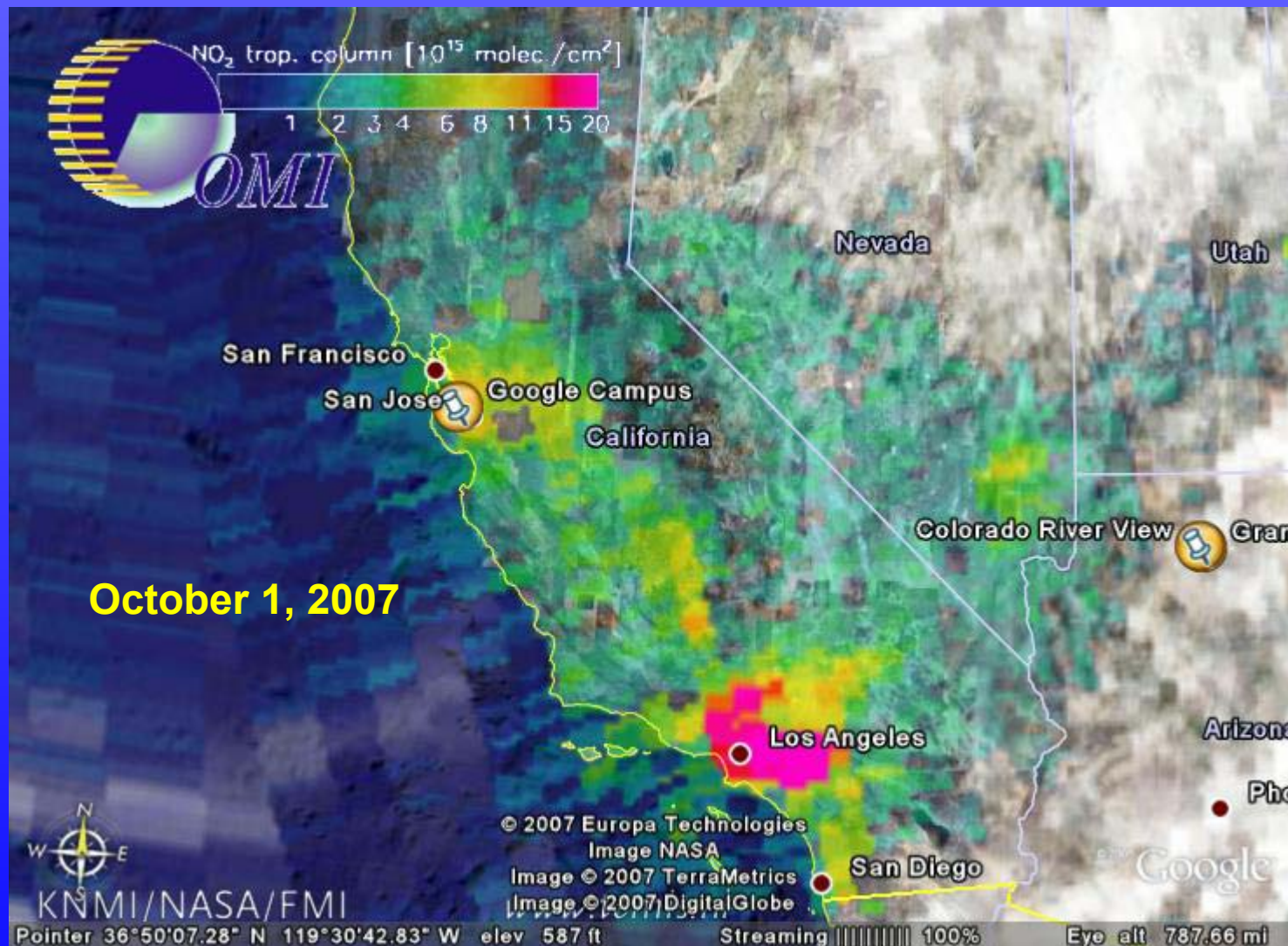


OMI Update 2007



Pieter Levelt (KNMI)

Aura ST Meeting, 1-5 October, 2007, Pasadena, CA, USA

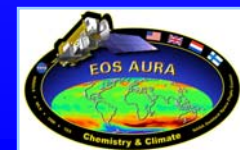
Operations Status

- * There have been no changes to the Nominal Operations Baseline.
- * There has been no data loss during the past year.
- * Instrument performance is excellent *but the CCD row anomaly needs attention.*
- * Changed commanding of Mechanisms is successful (FMM Anomaly Feb 28, 2006)
- * Instrument is very stable.
- * Detailed comments have been provided to ESMO on the impact of the possible AURA re-phasing on OMI Operations and the OMI Operations Baseline.



Data Processing

- 19 March – 12 September 2007:
OMI reprocessing Collection 3 L1b data using a time dependent calibration file.
- 24 September 2007 onward:
Start generating various Collection 3 L2 products in forward stream.
- Some products will be delayed because they are not ready for collection 3 (e.g. NO₂ trop)
- October 2007 (this week!): Public release of Collection 3 L1b data
- Fall 2007: Start generating NRT stream for various Collection 3 L2 data products.
- **Before end 2007: Production and release of the new Collection 3 L2 data products for the whole OMI mission.**



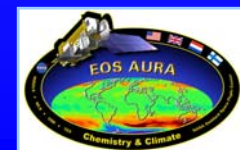
Level 1b collection 3

- Improvements on:
 - Straylight
 - dark current correction (striping reduction)
 - dead and bad pixel map
 - RTS map
- Remaining issues in collection 3 will be worked on
 - wavelength correction in case of small S/N
 - residual swath angle dependent radiance/reflectance
- New issue: row anomaly

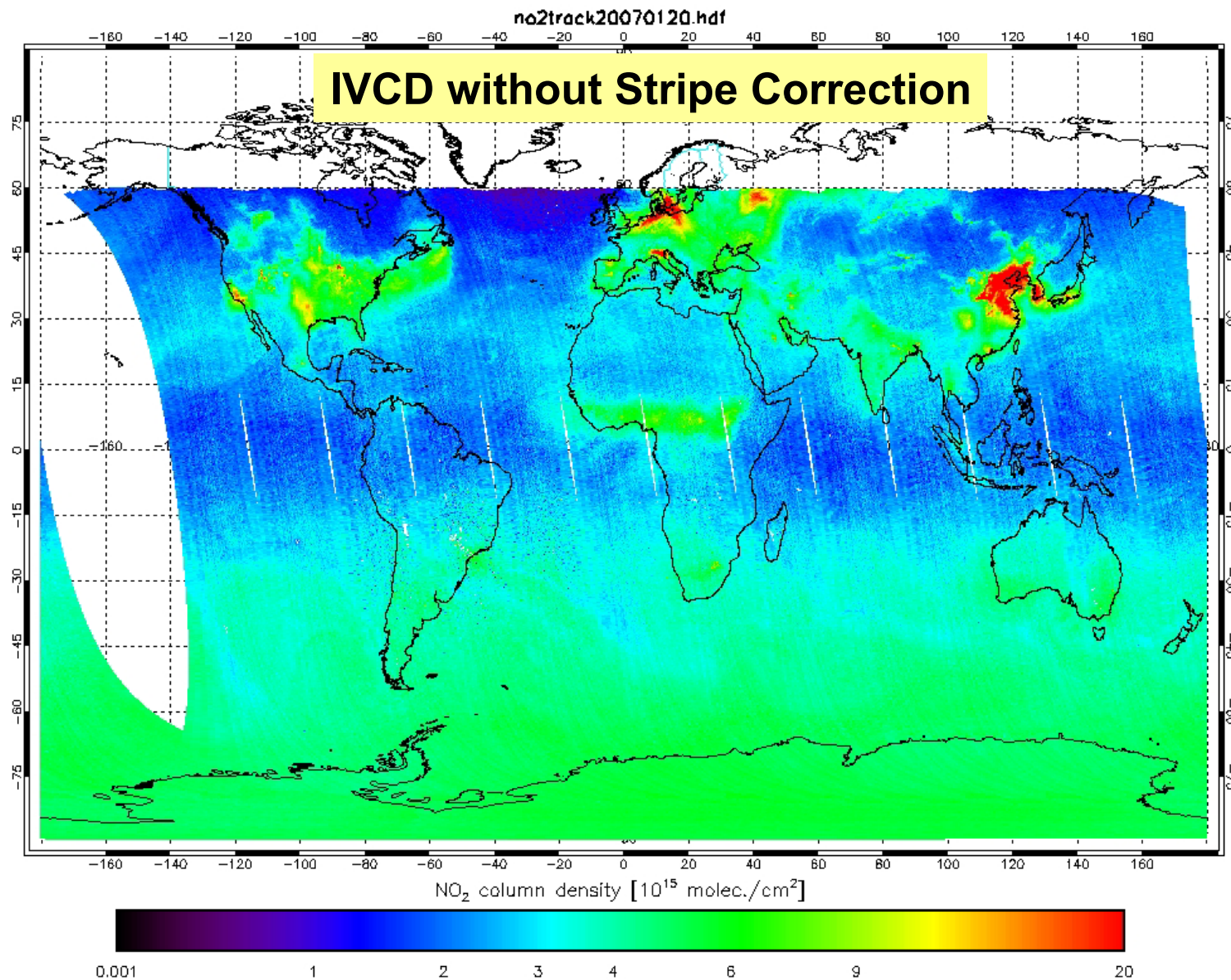


Level 2 Updates

- Level 2 algorithms have been or are currently updated for the Collection 3 data set;
- The improved Level 1B results in strong reduction of stripes and small fit residuals (example NO₂ next slide);
- Due to the updated level 1b and some level 2 new algorithm versions several improvements have been introduced, which causes discontinuity with Collection 2 data.
- All Level 2 products will be reprocessed for the whole missions in the coming months to obtain collection 3 for the end of the year.

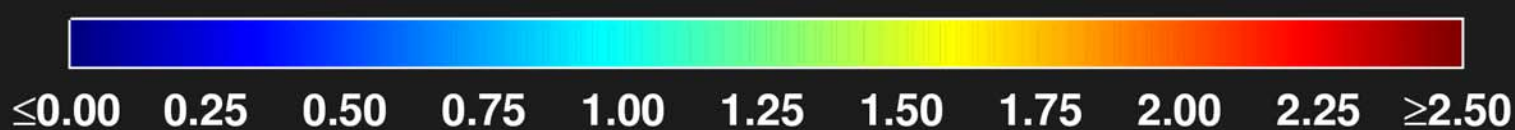
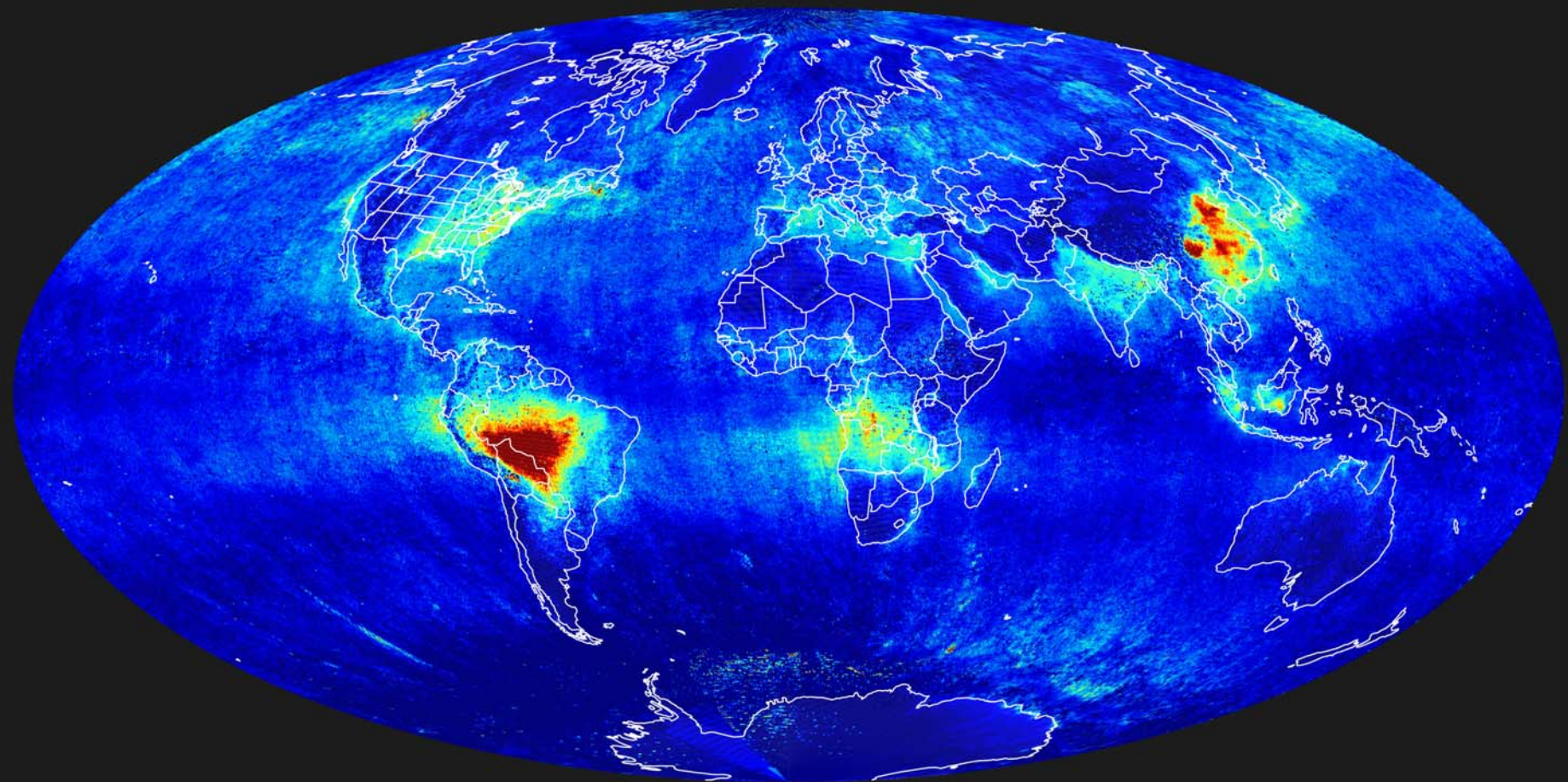


NO₂ Collection 3



HCHO

OMI HCHO September 2006 V003



1.00×10^{16}
mol/cm²

OMI Data product	Collection 2	Collection 3
Level 1b	Not released	released
O3 TOMS	released	To be released
O3 DOAS	released	released
Cloud O2-O2	released	released
Cloud Raman	released	To be released
Aerosol UV	released	To be released
Aerosol multi wavelength	Not released	To be released
UV-B	released	To be released
SO2	released	To be released
NO2 trop	released	Later release
HCHO	released	Later release
OCIO	released	Later release
BrO	released	Later release
O3 profile	Not released	Later release



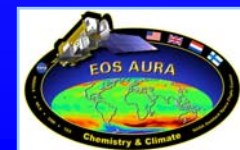
OMI Validation Papers collection 2 in JGR issue on September 27, 2007

	Submitted	Reviewed	Accepted
NO2	6	3	0
Clouds	2	2	0
Ozone	7	5	3
Aerosols	2	2	1
Surface-UV	1	0	0
VF Delivery	1	0	0
SO2	2	0	0
Validation	5	3	0
Overview	4	3	1
Total	30	16	5

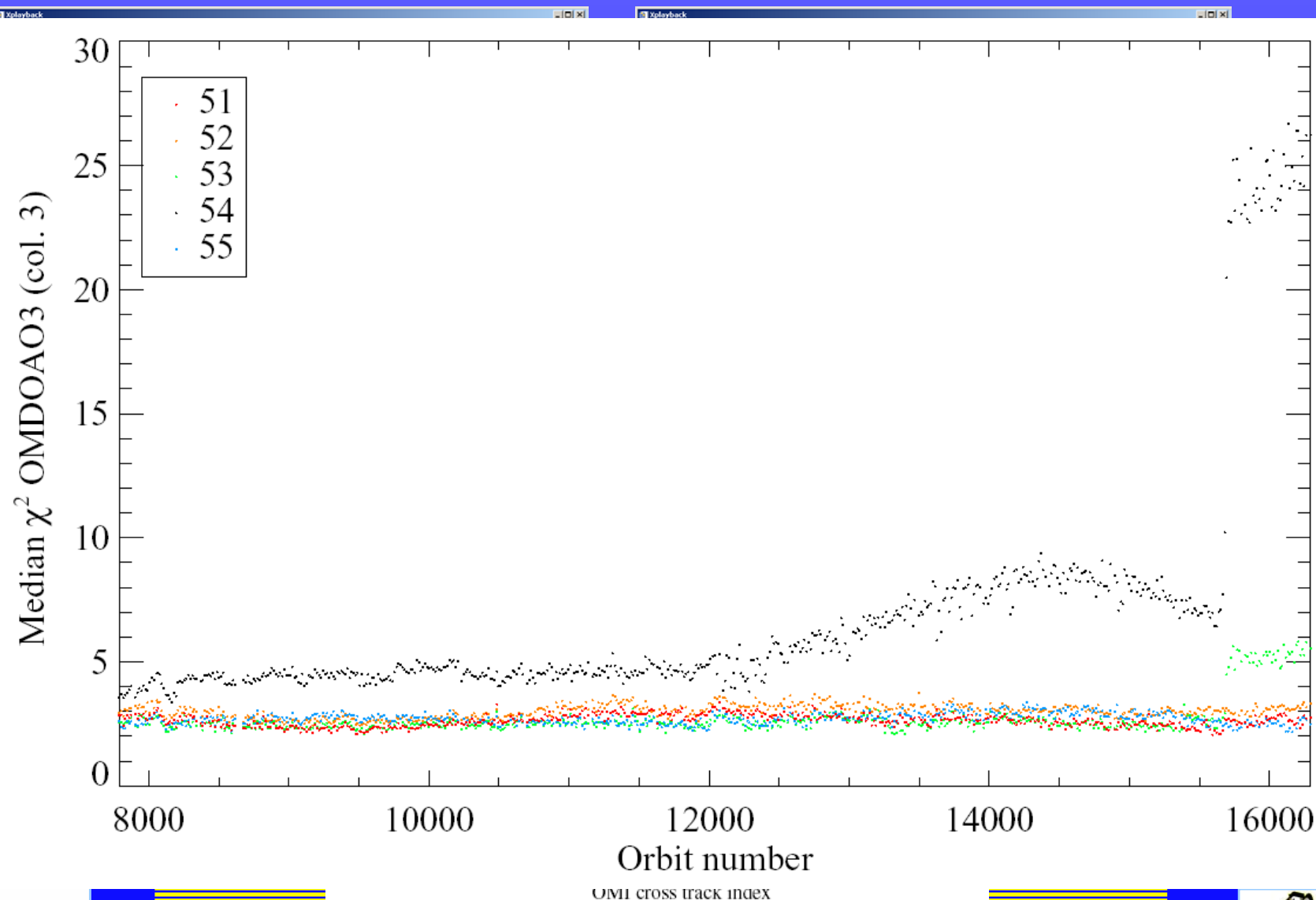
**Please send updates on your progress to Joanna Joiner
[Joanna.Joiner@nasa.gov] and Mark Kroon [mark.kroon@knmi.nl]**



Aura ST Meeting, Pasadena, CA
Prof. Dr. P.F. Levelt, KNMI

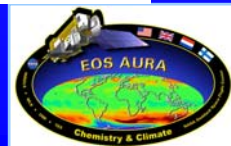


Row anomaly



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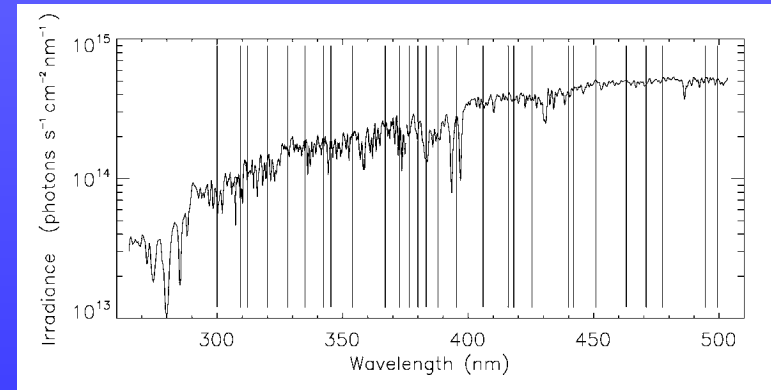


Row anomaly

- Affects all columns (= wavelengths) rows 53 and a bit 54 in UV2 and VIS channels.
 - Seen in radiance, not in irradiance, WLS, dark current and LED measurements:
this rules out that the anomaly is caused by detector radiation damage.
- Affects level-2 data products significantly.
- Existed as far back as 1 January 2006, but between 25 and 27 June 2007 a change occurred. This change was not instantaneous, but took about 2 days.
- Seems to be more or less stable for the time being after 27 June 2007: can in principle be corrected.
- Cause is under investigation: potentially an unknown object is optically blocking the affected viewing angles in the radiance mode.

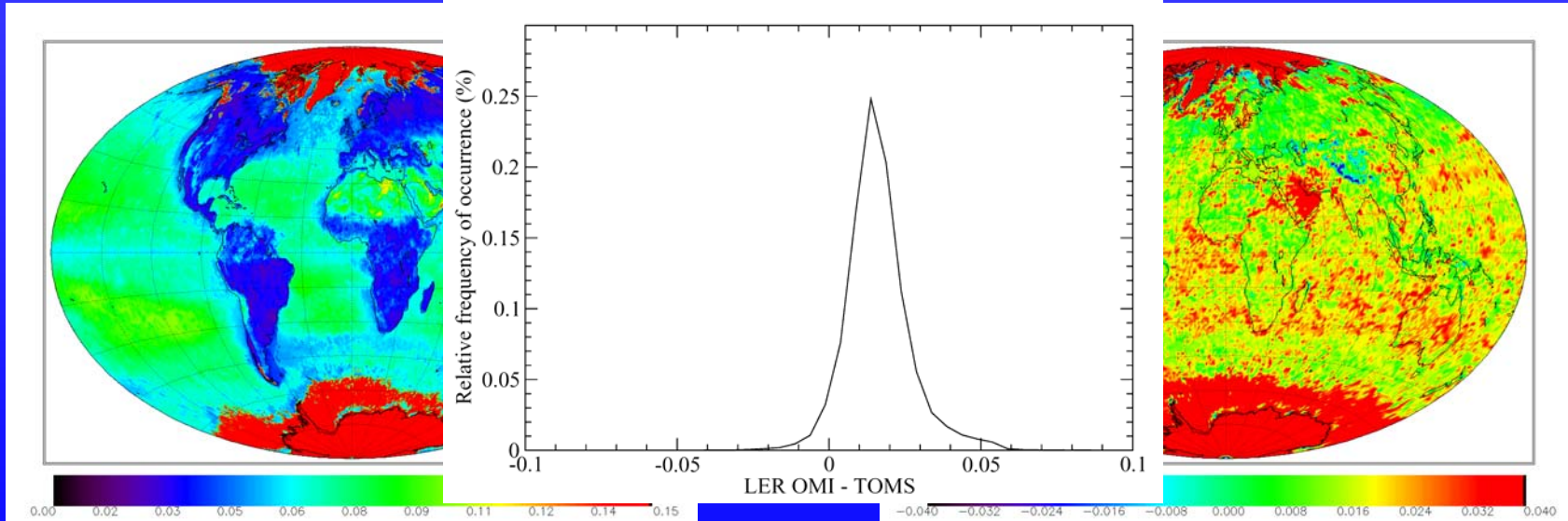
Surface albedo

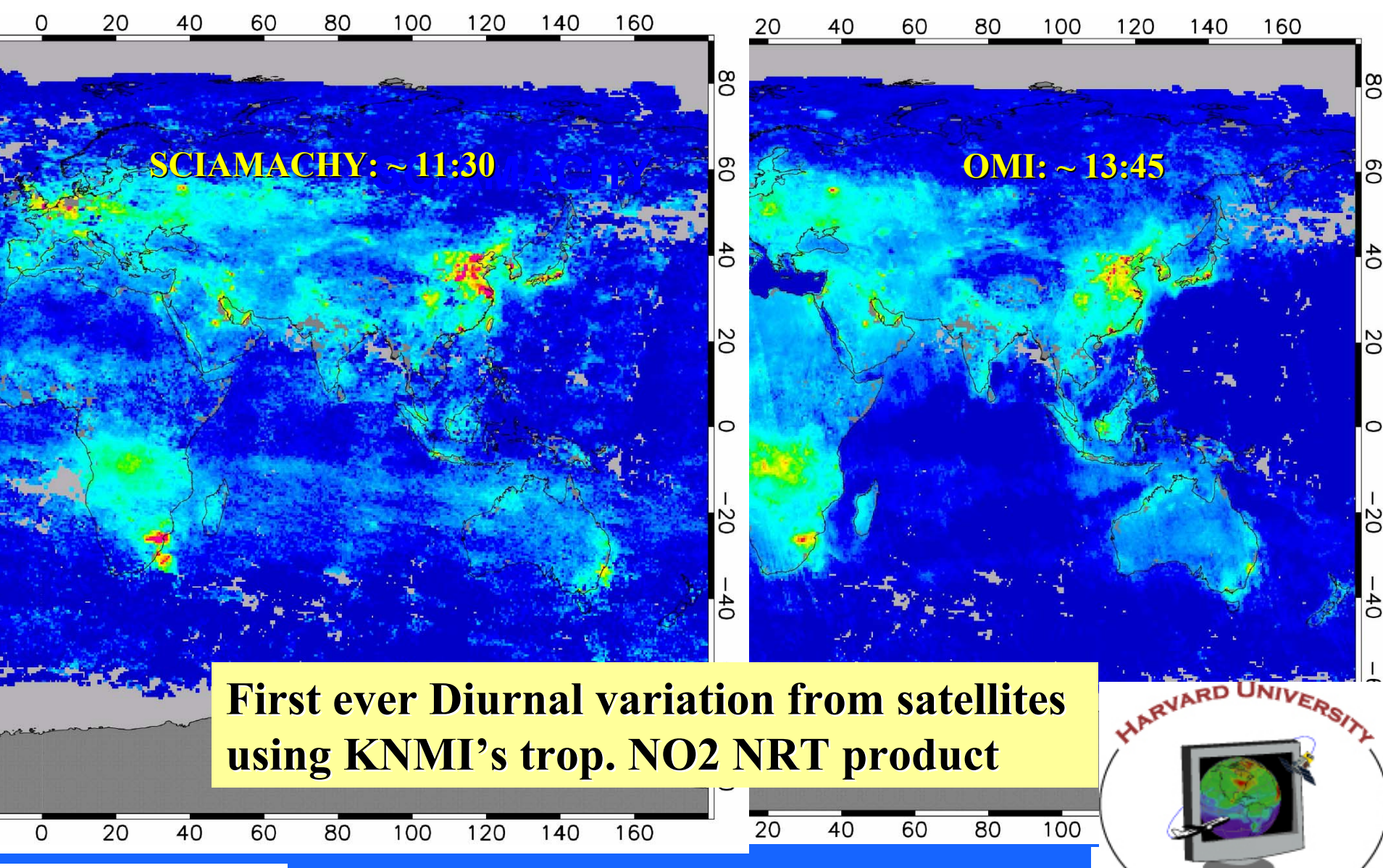
- Based on 3 years OMI data.
- Monthly time resolution.
- At 34 wavelengths in range 312-499 nm in UV2 and VIS, bands of 1 nm.



OMI annual MLER at 380 nm

Annual MLER difference OMI-TOMS at 380 nm

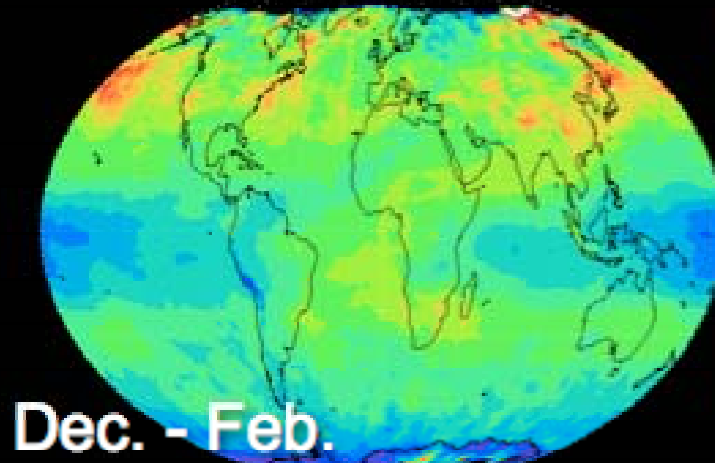




Concurrent measurements of tropospheric NO₂ from OMI and SCIAMACHY

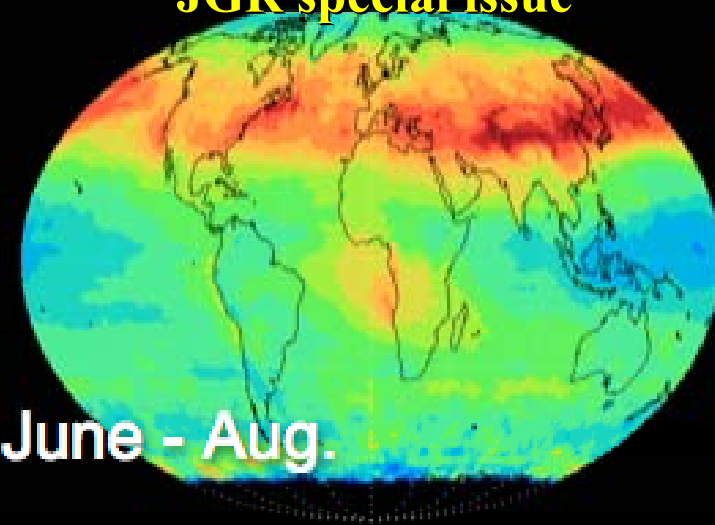
Folkert Boersma, Daniel Jacob, Henk Eskes, Rob Pinder, Jun Wang, and Ronald van der A

Seasonal TOP Mixing Ratio



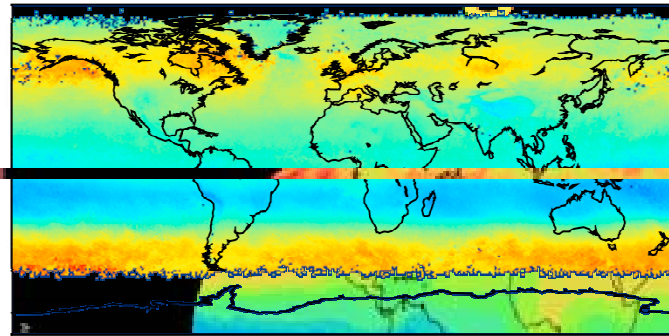
Dec. - Feb.

Schoeberl et al.
Submitted to
JGR special issue



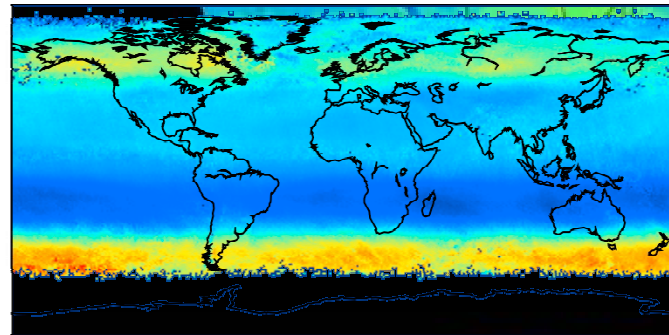
June - Aug.

Total Column [DU], 1-20 August 2006, CF<0.3



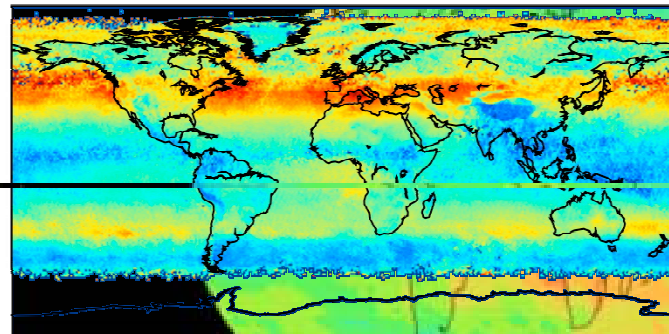
400
380
360
340
320
300
280
260
240
220
200

Stratospheric Column [DU], 1-20 August 2006, CF<0.3



340
320
300
280
260
240
220
200

Tropospheric Column [DU], 1-20 August 2006, CF<0.3

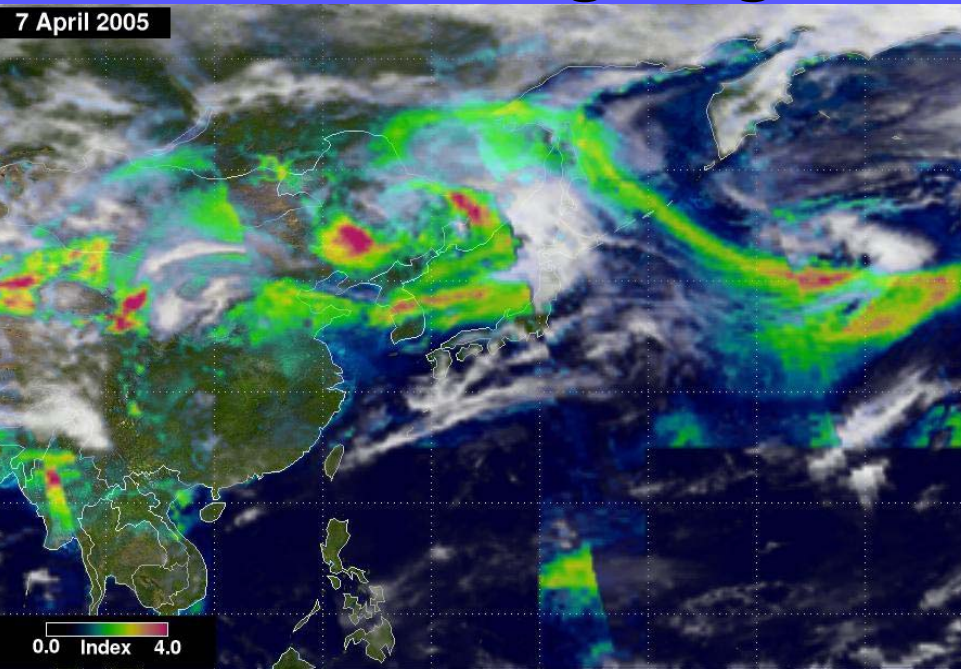


80
72
64
56
48
40
32
24

KNMI OMI O3 profile retrieval
De Haan and Veeckind

Aerosol Detection in the UV: A Unique OMI Capability

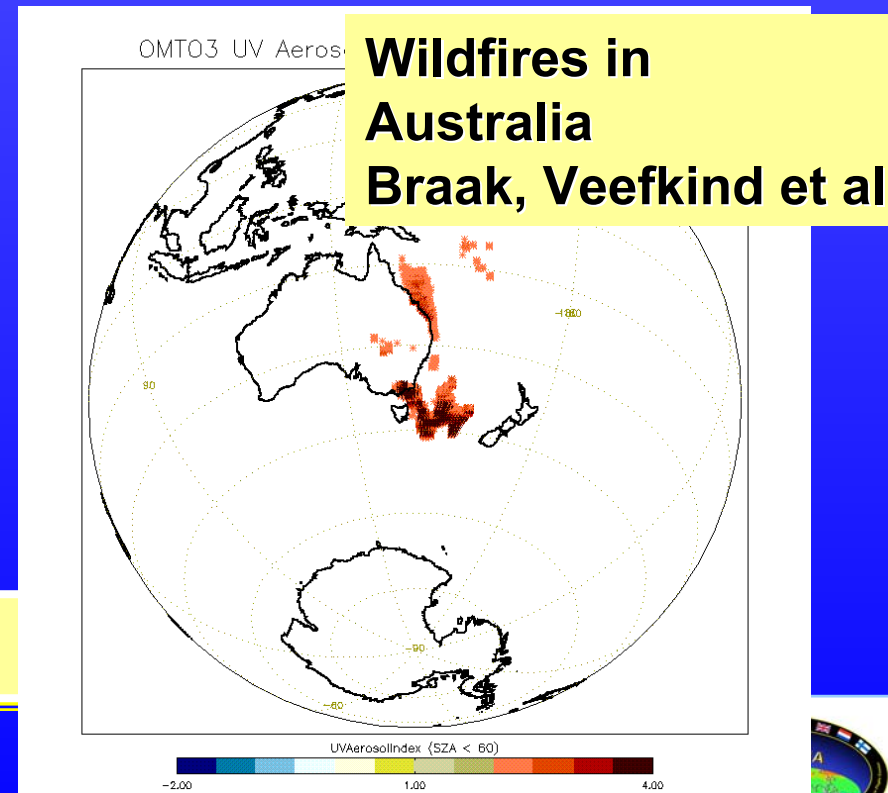
Long range transport of aerosols



With OMI measurements in the UV desert dust and biomass burning plumes can be traced over large distances.

Torres, Bhartia, NASA GSFC, ATMOS

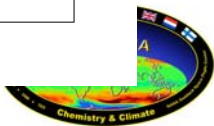
**Aerosol detection above clouds:
OMI Aerosol Index (color scale)
OMI reflectivity (gray scale)**



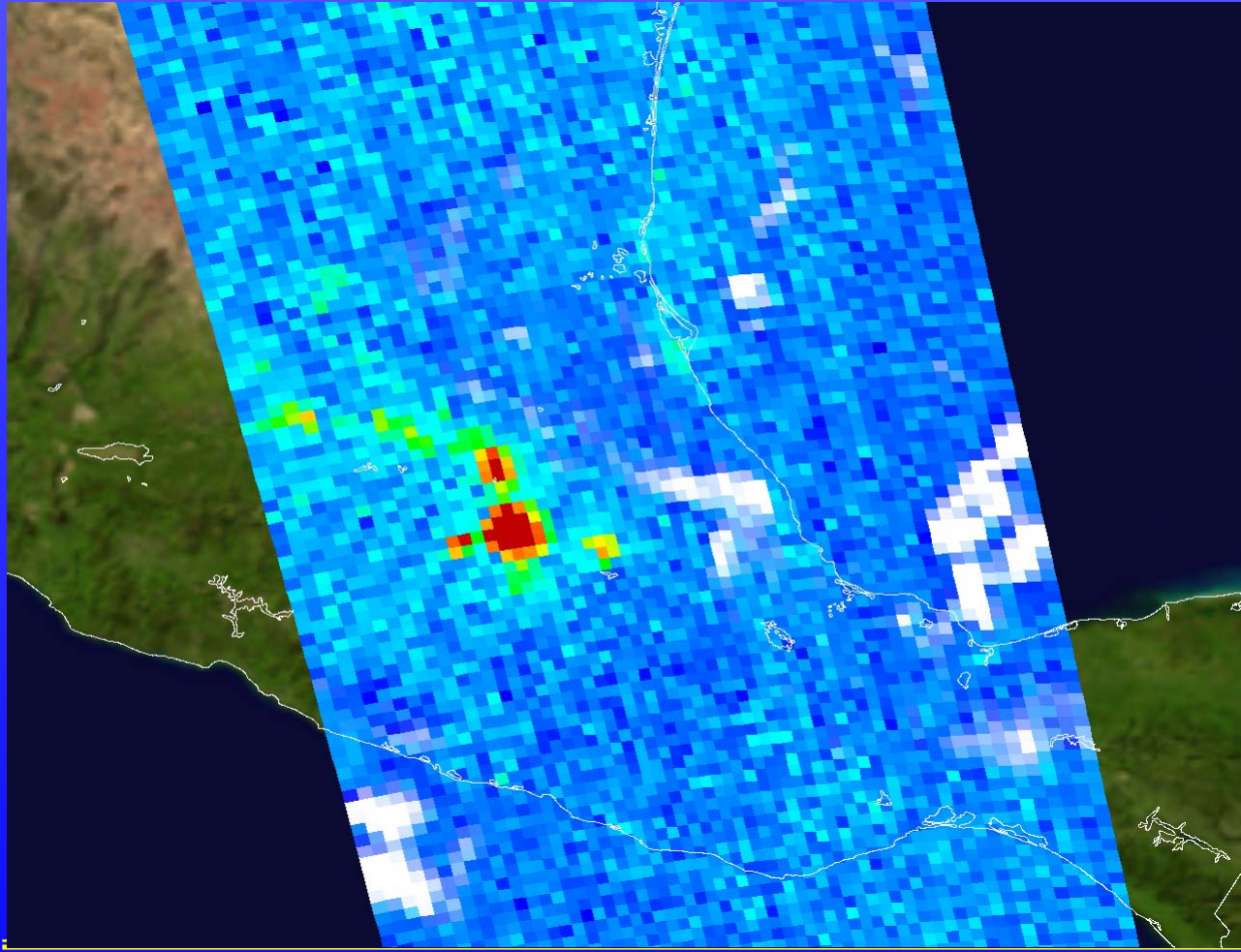
Aerosol detection above land and ocean.



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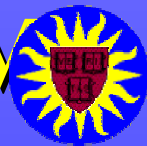


Study Megacities with OMI data: Mexico City

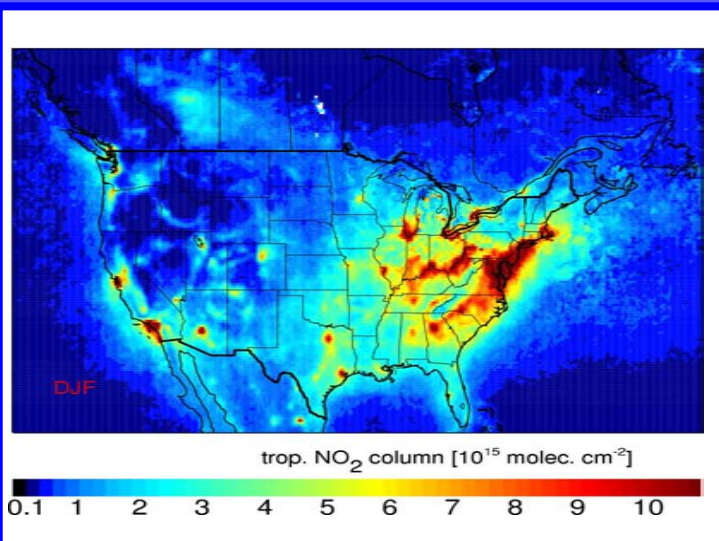


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Ground-level NO₂ Inferred from OMI

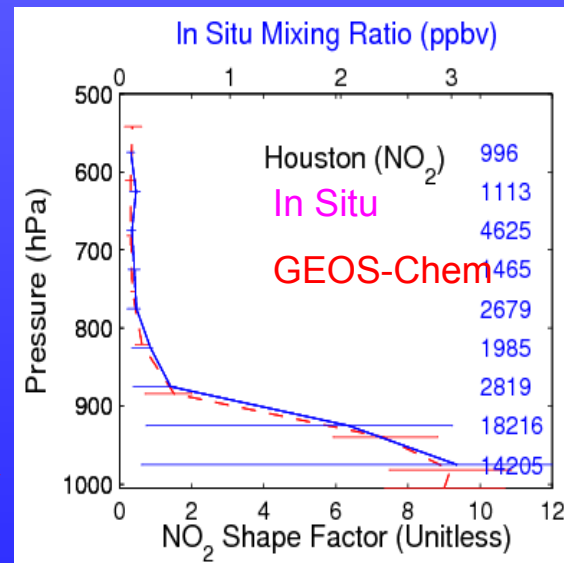


OMI Tropospheric NO₂ Column



Lamsal et al., JGR, submitted

Modeled NO₂ Profile

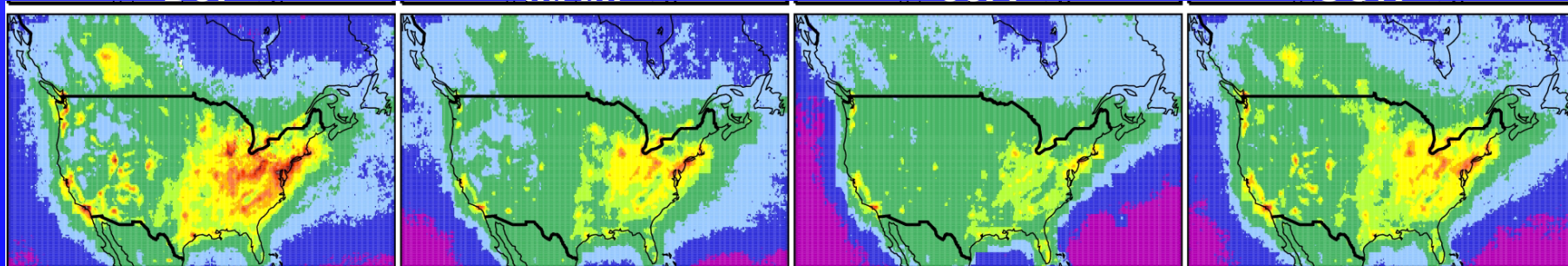


DJF

MAM

JJA

SON



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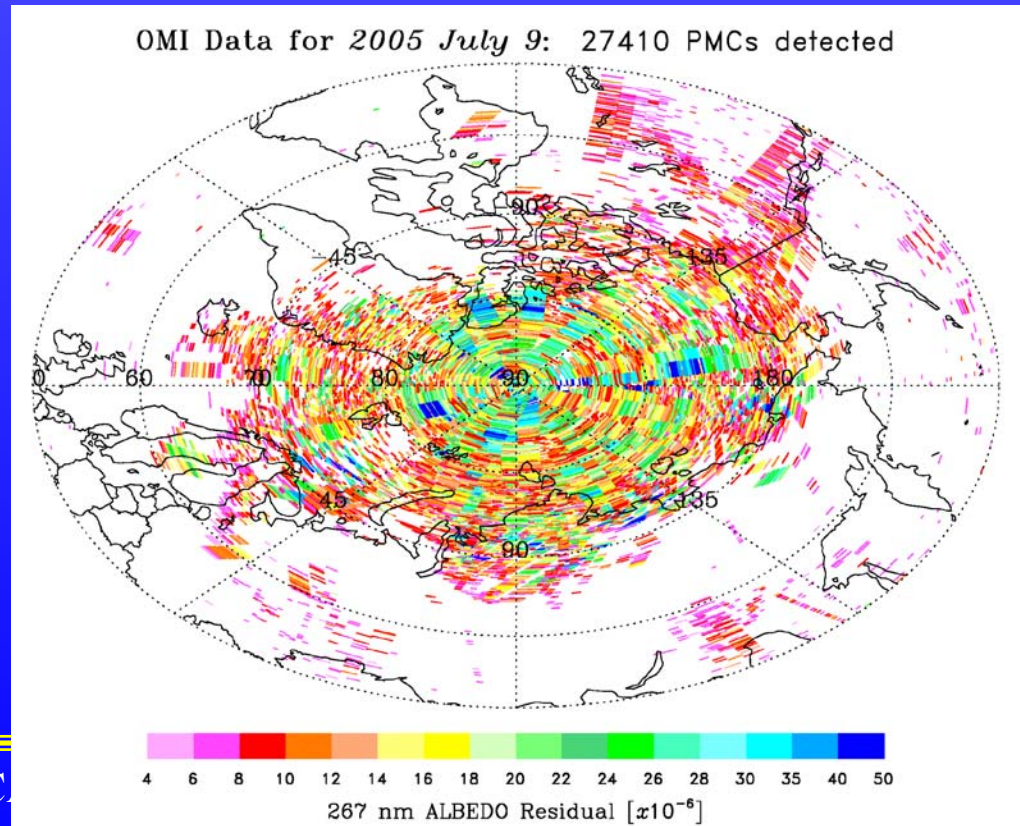
DALHOUSIE
UNIVERSITY



Polar Mesospheric Clouds (PMCs) by OMI

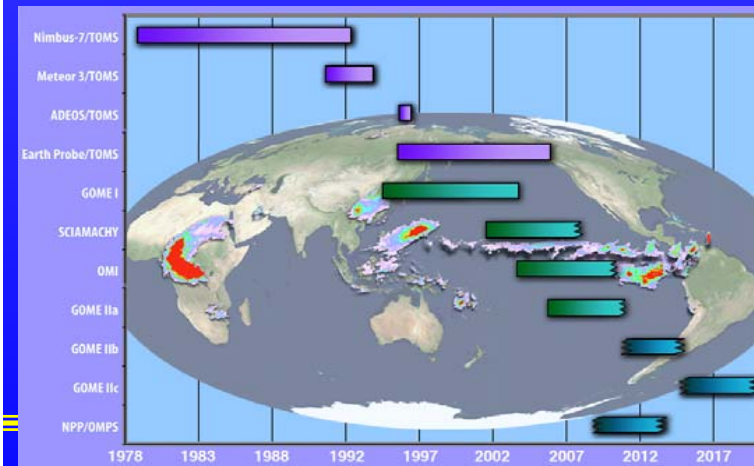
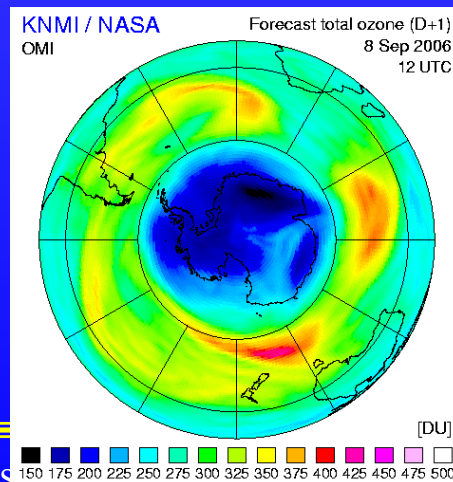
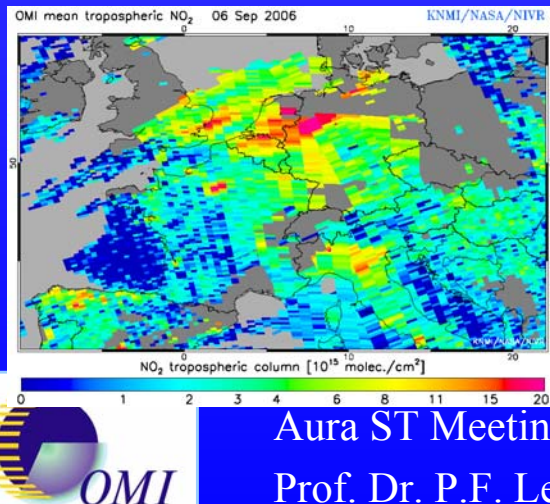
- Polar mesospheric clouds (PMCs) are observed in the polar regions at 80-85 km only during summer. PMC formation and brightness are very sensitive to temperature and water vapor at this altitude.
- 28-year data record from SBUV instruments shows long-term increases in PMC frequency and brightness. This result may be forced by climate change effects.
- OMI measurements give factor of ~ 100 increase in PMC detections, better sensitivity, polar coverage to 90° latitude, better particle size information compared to SBUV/2.
- **Analysis of full OMI data set will give unique insights into observed PMC behavior.**

Deland et al.



Near-real Time Data Products

- On www.temis.nl the following near-real-time information can be found:
 - Images of tropospheric NO₂
 - Images of total column ozone
 - Assimilated and forecasted total ozone (data will be released soon!)
- O₃ data (TOMS and DOAS) are delivered to NOAA and ECMWF
- Serious plans for a NRT SO₂ product for aviation control



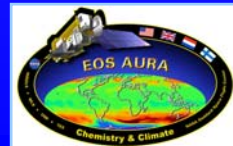
Thanks to OMI Science Team !

PK Bhartia	US OMI Team Leader	Pieter Levelt	OMI-Principal Investigator
Albert Fleig	Data processing	Bert van den Oord	Deputy PI
Richard McPeters	Dept. TL science	Pepijn Veefkind	Lead Algorithm WG
Lawrence Flynn	Ozone algorithm	Marcel Dobber	Lead Calibration WG
Jack Fishman	Trop. Ozone algorithm	Ruud Dirksen	Instrument calibration.
Kelly Chance	Trace gas algorithm	Robert Voors	Instrument calibration
James Gleason	NO2 algorithm	Quintus Kleipool	Instrument calibration
Joanna Joiner	Cloud algorithm	Johan de Haan	Cloud algorithm
Omar Torres	Aerosol algorithm	Mark Kroon	OMI Validation
George Mount	Instrument calibration	Ellen Brinksma	Validation + NO2 algorithm
Donald Heath	Instrument calibration	Folkert Boersma	NO2 algorithm + validation
Richard Cebula	Instrument calibration	Jacques Claas	Lead OMI Operations
Arlin Krueger	SO2 algorithm	René Noordhoek	OMI scientific secretary
Derek Cunnold	Ozone validation	Wim Som de Cerff	OMI data processing
Charles Trepte	Aerosol validation	Henk Eskes	OMI key ST member
Ivanka Štajner	Data assimilation	Roeland van Oss	OMI key ST member
Stanley Sander	NO2 validation	Piet Stammes	OMI key ST member
Ernie Hilsenrath	US co-PI	Hennie Kelder	OMI key ST member
		Gerrit de Leeuw	OMI key ST member
		Claus Zehner	OMI key ST member
Johanna Tamminen	Finnish co-PI	Frank Dentener	OMI key ST member
Gilbert Leppelmeier	Retiring Finnish co-PI	Ilse Aben	OMI key ST member
Anssi Mälkki	Finnish Program Leader	Ivar Isaksen	OMI key ST member
Esko Kyrö	Validation	Ulrich Platt	OMI key ST member
Aapo Tanskanen	Surface UV irradiance	Didier Hauglustaine	OMI key ST member
Seppo Hassinen	OMI VFD products	Paul Simon	OMI key ST member



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